

Remarks/Arguments

Claims 1, 2, 4-12, 14-19, and 26 are currently pending in the application. No changes have been made to the claims.

Claims 1-2, 4-5, 9-11, 14-15 and 19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma (U.S. Pub. No. 2004/0105569) in view of Chang (U.S. Patent No. 7,154,560). This rejection is respectfully traversed.

There are significant differences between both Sharma and Chang and the claimed invention which is directed to solving the problem of detecting whether a printed image having a watermark is an original or a copy. Sharma embeds a watermark in a transformed image and adds an orientation pattern. In detecting the watermark, Sharma uses correlation operations to match the orientation pattern with the target image. This provides information that helps determine rotation, translation and scaling needed to align the target image. Sharma teaches a method of embedding and detecting a watermark using linear transformations and correlations. Sharma does not address the question of whether the watermarked item is original or a copy.

Chang teaches watermarking of purely digital data. In digital data, adding a watermark can cause the pixel values to go outside the luminance range of the image format. For example, in many digital images such as MPEG, the pixel value range is 0 to 255. Chang is concerned with maintaining the watermark during image compression. This is similar to, but different from the problem of maintaining the watermark during printing and scanning. In equation 2 and 3 Chang shows a nonlinear transformation of the digital data to keep the watermarked image pixel values in the allowable range for the image format. This nonlinear digital transformation results in suppression of the watermark in bright and in cluttered areas. Chang then proposes increasing the watermark strength in areas where compression of MPEG would suppress the watermark. Thus he does not at all address the non-linear effect that occurs because

of the printing and scanning process that is the basis of the effect in the claimed invention to permit the determination of whether a printed image with a watermark is an original or a copy.

Applying the above differences to independent claim 1, the combination of Sharma and Chang do not, at a minimum, teach or suggest the following element (e) of claim 1 (and the corresponding verbiage of element (e) of independent claim 10).

(e) Determining a correlation between the recovered watermark data for at least some of the data blocks and a brightness of said data blocks;

The Examiner admits that Sharma does not teach or suggest element (e) of claim 1 and attempts to correct this deficiency utilizing the teachings of Chang. However, the correlation between the recovered watermark data and the brightness of the blocks is a nonlinear transformation caused by the **print/scan** process. Chang is concerned with maintaining the watermark during image compression. This is different from the problem of maintaining the watermark during printing and scanning. (i.e., compression is a digital nonlinear transformation, and differs from the nonlinear effects of printing and scanning). In equation 2 and 3 Chang shows a nonlinear transformation of the digital data to keep the watermarked image pixel values in the allowable range for the image format. This nonlinear digital transformation results in suppression of the watermark in bright and in cluttered areas. Thus Chang does not teach or suggest performing the claimed correlation on data obtained by scanning a printed image having a watermark as set forth in independent claims 1 and 10.

It is submitted that the Examiner has not established a prima facie case of obviousness for independent claims 1 and 10 as well as for claims 2, 4-5, 9-10, 14-15, and 19 all of which depend from either claim 1 or claim 10.

Claim 12, claims 6-7 and 16-17, claims 8-18, and claim 26 have respectively been rejected under 35 U.S.C. 103(a) over Sharma and Chang in combination with other references cited by the Examiner Claim 12 (Uchida), Claims 6-7 and 16-17 (Murakami), Claims 8 and 18 (Rhoads), and Claim 26 (Suhara). It is submitted that none of the additional cited references correct the deficiencies of Sharma and Chang as discussed above. Thus, since each of these claims depend from one of independent claims 1 or 10, the arguments set forth above are equally applicable to these rejections and are incorporated herein by reference. Thus, it is submitted that the Examiner has not established a prima facie case of obviousness for claims 12, 6-7 and 16-17, 8-18 and 26.

Applicant respectfully submits that all of the claims of this application are in a condition for allowance and favorable action thereon is requested.

If the Examiner has any questions, please call the undersigned at the telephone number noted below. Please charge any additional fees or credit any overpayment to Deposit Account Number 16-1885.

Respectfully submitted,

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